

Teaching community health by exploiting international socio-cultural and economical differences.

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Abstract - We describe a CSCL scenario through which socio-economic and cultural differences between countries can be exploited for teaching community health to medical students in Switzerland, Tunisia, Cameroon and Lebanon. This scenario is structured around phases and roles. In order to stimulate social interaction, the activities rely on the confrontation of different national health contexts and different health issues. The activities take place in an hybrid face-to-face and web-based learning space, regulated by the teachers. The knowledge base of the environment contains various forms of knowledge such as fact sheets, clinical cases, intervention strategies, web links and a glossary. The course contents have been identified through the DELPHI method allowing the construction of a consensus between health experts of the four countries. The environment interface is articulated around a graphical representation of the scenario. This lightweight web site can be easily consulted by students with low bandwidth.

Keywords – CSCL, medical education, third world, public health, cross-cultural

1. Introduction

When browsing online medical sites, it is obvious that most information is produced as well as consulted by the rich countries of the planet (defined in this paper as North, in opposition to South, or developing and less rich countries). A recent study by Health On The Net, showed that 86% of net surfers consulting online medical resources for health professionals were from North America and Europe (1). Lack of connection and of relevant content for the South currently prevents Internet to play a major role with respect to global concern such as public health. The priority needs and prevention and action plans would profit from increased exchange between North and the South. Internet could indeed foster processes of democratisation and development of health on a global level. We hypothesise that this may be improved and accelerated by providing structure to the North-South exchange. Our project therefore brings together experts in community health, medical education and educational technology at the french-speaking Universities of Geneva (Switzerland), Beirut (Lebanon), Monastir (Tunisia) and Yaounde (Cameroon) in order to develop a CSCL environment which will connect students and teachers of these countries around a common goal: learning and teaching community health.

Successful CSCL needs a well orchestrated search for consensus exploiting differences of opinion. When discussion is induced by obliging partners with opposing views to search for problem solutions, deepening of understanding is fostered. We here describe a way in which socio-economic and cultural differences between countries can be exploited by designing a well-structured learning scenario for our students. We hypothesise that:

- CSCL may profit from the socio-economic and cultural differences between students from the partner countries when put in a well-structured and defined learning scenario.
- CSCL with simple internet technology may improve international exchange and communication on community health issues, specially on a North-South axis, possibly adding to global health.

2. Design Principles

The design of our CSCL environment is based on seven principles.

1. **Exploit differences.** Although the role of conflict resolution in collaborative learning has been questioned (Dillenbourg, Baker, Blaye & O'Malley, 1995; Quignard & Baker, 1999), it remains nevertheless evident that differences of viewpoints between co-learners provide the dynamics for social interaction. In this project, we build upon two kinds of differences:
 - "Natural differences": Community health is bound to the local context, i.e. to social, cultural, economical and political differences. This project aims to engage students from Lebanon, Tunisia, Cameroon and Switzerland into activities in which the comparison of local issues and solutions is expected to reveal how health issues are related strongly to local contexts yet transposable to other cultural settings. Such an understanding is one of the very objectives of newly developed public health courses trying to integrate international health issues into local public health courses.
 - "Artificial differences": Several CSCL methods, known as JIGSAW methods, deliberately provide peers with divergent information in order to create the dynamics we look for. In this project, groups work on different health issues and on different case studies for the same health issue. Bridging differences between such cases is expected to support abstraction (Schwartz, 1995) and to foster a deeper understanding of the complexity of any health issue.
2. **Structure collaboration through a scenario.** Collaborative learning is a vague label that does not *per se* guarantee any cognitive effect. Effects depend on the extent to which peers engage into rich interactions. Proper designing CSCL implies creating specific structures that increase the probability that peers engage in such interactions. This structure, hereafter referred to as a **scenario** is based on **roles** and **phases**. A role defines what each peer has to do in the environment at each phase of the collaborative process. The scenario that we have conceived is presented in section 3.
3. **Regulate collaboration.** Well-structured collaborative processes still do not guarantee effective learning unless carefully regulated by a tutor (or by the group itself). Hence, the scenario does not only define the learners roles but also the tutor roles at different phases. The teachers are facilitators of the learning process. They do not give solutions, but rather intervene pertinently by starting a discussion and in general by stimulating interaction. They are present throughout all activities, both during introductory and debrief face-to-face meetings, and during the electronic forum-based international discussions. Therefore, these different agents must be explicitly represented in the data structure. The different agents have different rights in the environment:
 - Net surfers (guests) have the right to view all of the environment, but cannot modify the knowledge space or discuss in the forums.
 - Enrolled students have additional rights depending on their roles in the scenario. For example in the scenario presented in section 3, students can join forums but can only modify some elements of the knowledge space (fact sheets and intervention strategies).
 - Teachers have rights to edit content and have specific duties to validate part of the information entered by the students.
4. **Reify the scenario.** The scenario we are proposing is necessarily complex, in particular because of the parallel processing of the problems and because of the number of involved countries. To facilitate navigation and working for the students and teachers optimally we designed an environment around an explicit graphical representation of the scenario. Students can find their way in the whole scenario with a graphical representation of the scenario on the top of the page under which a cursor moves according to time. Thus the user always knows in which phase he or she progresses. If the user wants more information on a particular phase, he can click on the corresponding zone of the image (See Figure 1).

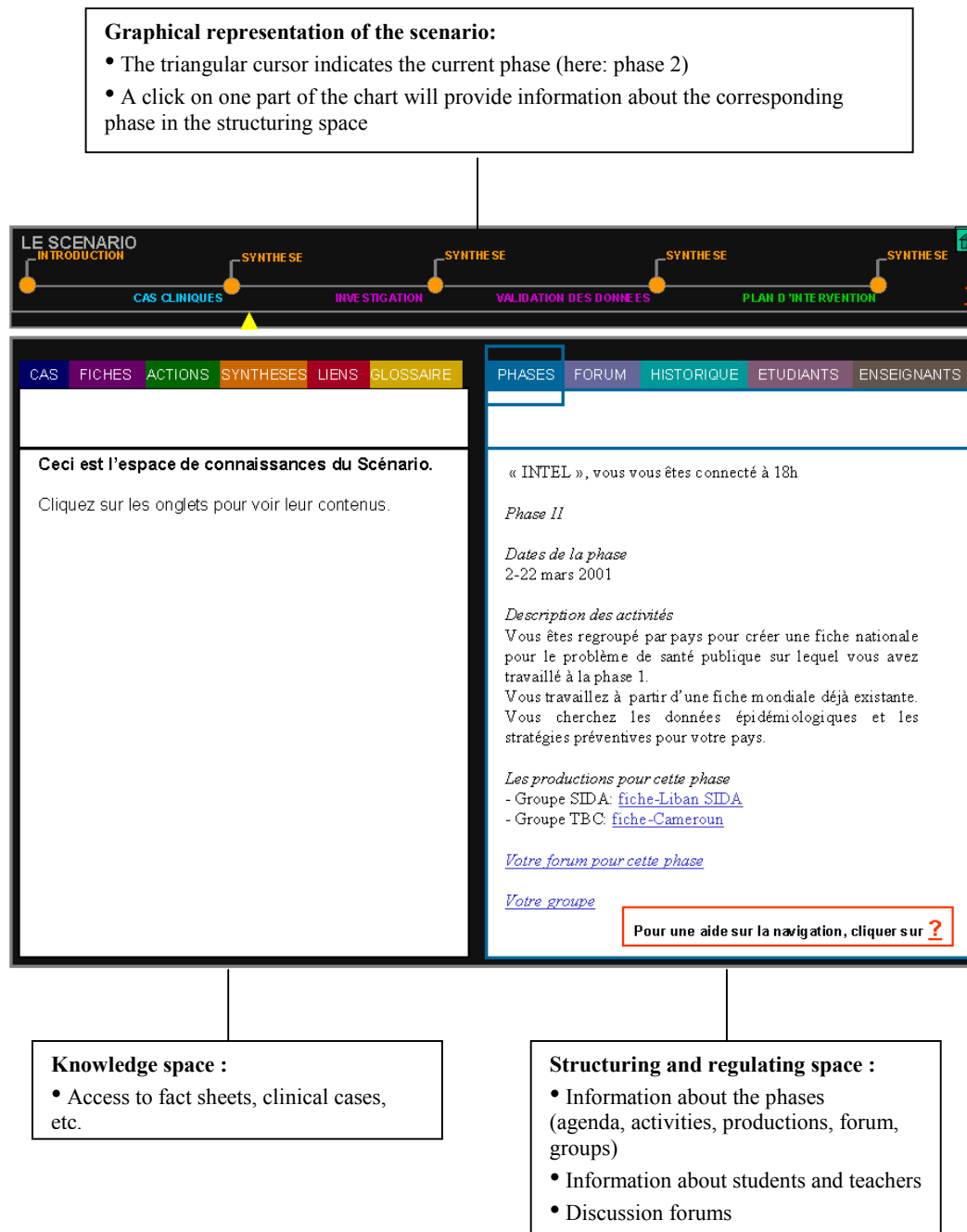


Figure 1. Interface and graphical representation of a scenario (in French).

5. **Use hybrid scenario.** On the one hand, web-based activities are fragile; adding face-to-face interactions increases robustness. On the other hand, we do not see any reasons why web-based environments could not enrich existing face-to-face teaching situations. Hence, the following scenario is hybrid, i.e. integrates both forms of activities.
6. **Build "around" a knowledge space.** The design of any web site requires careful planning of knowledge management. Plain html is a dead end. This is even more true for CSCL environments in which this knowledge space is (i) what defines roles in terms of reading/writing/changing roles and (ii) what students co-construct. Each domain has its own ontology. In this project we build upon a simple classification:

Fact sheets	A fact sheet. includes epidemiological data (ex: death rate, incidence rate – number of new cases per year -, etc), biological data (ex: transmission mode, patho-physiological mechanisms, etc), data on prevention strategies and socio-politico-economic dimensions of a priority problem (AIDS, cancer, etc). For each problem a fact sheet for each partner country (four in total) will be created.
Clinical cases	A case includes the complaints of a patient, the history and the results of the physical examination and the lab analyses. The cases are written so to be used as a basis for discussion of public health concepts.
Intervention strategies	Each strategy includes a) objectives, b) actions to be carried out, c) resources necessary, and d) a list of evaluation criteria.
Links	A collection of commented links to interesting web sites with community health content (WHO, Red Cross, etc.).
A glossary	Definitions of the terms used in the web site

7. **Negotiate knowledge space.** The database is initially filled by the teachers (both from North and South). In particular the first batch of clinical cases, the glossary and the collection of commented links will be created by our experts. Subsequently most of the content will be created by the students while participating in the various learning activities. However, it is difficult to agree upon which knowledge should be integrated. In this project, the priority health problems that the fact sheets, the clinical cases and the intervention strategies deal with were selected by means of a **DELPHI** analysis in a panel of public health experts of the four partner countries (Chastonay et al, in preparation). The DELPHI method is a way to come to a consensus between experts in a given domain. We sent out questionnaires to community health professionals of the four partner countries and asked them to list priority health problems on a global and on a national level. Based on the results, we then sent them a second questionnaire with the top ten items for both categories and asked them to rank order. The third round consisted in asking them to comment on the final order. The thus identified priority problems include: AIDS, cancer, infectious diseases, cardiovascular diseases and trauma related to accidents.

3. *An example of a pedagogical scenario*

The first teaching scenario that we develop for our system is aimed at the following students:

Monastir	Junior graduate students in medicine during their fellowship in the department of public health.
Yaounde	Master degree in public health students.
Beirut	Certificate of Epidemiology students and family medicine residents
Geneva	Certificate of Public Health students, a continuous course aimed at introducing basic concepts of public health (Chastonay, 1994).

The scenario includes four phases. Each phase is made up of a face-to-face meeting from two to four hours followed by four weeks of homework and on-line exchange (see Figure 2).

The students of the four countries are divided in thematic groups which follow in parallel the same learning activities. Five problems are treated in parallel: AIDS, cancer, infectious diseases, cardiovascular diseases and trauma related to accidents. Each group includes 4 students of each country (16 on the whole) and a tutor.

During a first face-to-face meeting gathering all participants of a country, the activities of the phase are introduced to the students. During the four weeks which follow, the students work in their specific thematic group and fulfil the task which was given to them (see below). Communication between the students of a group is during face-to-face meetings between the participants of the same country and on an electronic forum specific to the group, regulated by the tutor, for all international students of the group. The products of a group for any phase are presented to all participants and discussed during debriefing sessions. Subsequently the activities of the following phase are introduced.

This structure is repeated four times for the whole scenario. The student composition of the thematic groups does not change from one phase to another.

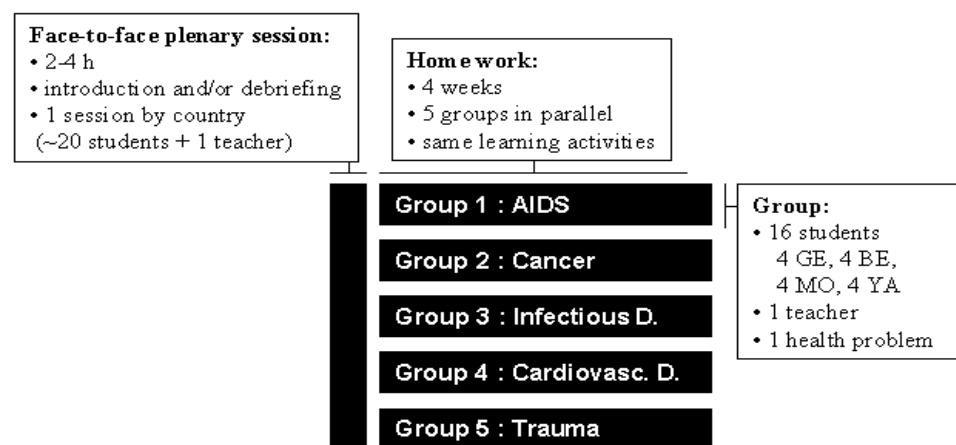


Figure 2 : Structure of one phase of the scenario. The structure of one phase is repeated four times for the whole scenario.

Phase 1. The objective of phase 1 is to introduce and reinforce general concepts of public health starting from particular clinical cases. At the beginning, each thematic group is divided into two sub-groups each one made up of 2 students per country, that is 8 students on the whole.

Each sub-group receives a clinical case, taken from the knowledge base and related to the health problem on which they work. For example for cancer, the first sub-group works on the case of a woman with a breast cancer whereas the second sub-group concentrates on the case of a man with a lung cancer.

Each sub-group discusses the case in a specific forum. The teacher-animator stimulates and guides the discussion in order to lead the students to identify and discuss the public health elements of the case. For example for cancer, the tutor asks questions like: What elements could have contributed to develop that cancer? How could the patient have been informed about the risks she/he took?

Regularly the two sub-groups gather in the same discussion forum and identify common points and differences between the two cases, with regard to public health. The teacher-animator stimulates and guides the discussion, with questions like: What is the difference between the two cases? What does this difference imply in terms of strategy for the various countries?

For this phase the productions of the students are of two types: discussions on the forum and a synthesis of the elements identified by each thematic group which are presented during the face-to-face debriefing meeting.

The repartition of sub-groups within a thematic group and the learning activities for phase 1 are summarised in Table 1.

Sub-group repartition	Activities	Resources	Productions
2 sub-groups per thematic group. <u>Cancer:</u> Sub-group 2.1 = 8 students (2 BE, 2 GE, 2 MO, 2 YA) Sub-group 2.2 = 8 students (2 BE, 2 GE, 2 MO, 2 YA)	a) Case discussion (1 case / sub-group) b) Case comparison (between sub-groups)	Clinical cases (knowledge base)	a) Forum discussion b) Group synthesis

Table 1. Summary of sub-group repartition, learning activities, resources and students productions for phase 1.

Phase 2. The objective of phase 2 is to investigate a health problem as a whole by presenting, among others, the epidemiological data and the prevention strategies for a given country.

Within a thematic group, the students gather by country and create a national fact sheet for the problem. For example the four Swiss students of the cancer group create a fact sheet "Cancer-Switzerland" which they enter in the database through an online form. This fact sheet is build using information from the Web sites proposed in the knowledge base and with data gathered by field investigations (e.g. library or interviews with various health professionals).

When the fact sheets are done, all the students of the group gather in their forum and discuss with their tutor the differences and the similarities between the fact sheets of the four countries.

During the debriefing phase, all fact sheets are commented by the students and the tutor. The repartition of sub-groups within a thematic group and the learning activities for phase 2 are summarised in Table 2.

Sub-group repartition	Activities	Resources	Productions
4 sub-groups per thematic group. <u>Cancer:</u> Sub-group 2.1 = 4 GE students Sub-group 2.2 = 4 BE students Sub-group 2.3 = 4 MO students Sub-group 2.4 = 4 YA students	a) Creation of a fact sheet (1 per sub-group) b) Discussion about countries differences (between sub-groups)	a) Field research b) Links to web sites (knowledge base)	a) Fact sheets b) Forum discussion

Table 2. Summary of sub-group repartition, learning activities, resources and students productions for phase 2.

Phase 3. The objective of phase 3 is to reinforce phase 2 by introducing methodological principles about public health data validation.

During the debriefing meeting of phase 2, the participants will have identified any needs for clarification or refinement concerning the way in which statistical data were collected, treated or presented for the fact sheets.

During phase 3, the students modify their fact sheet according to the comments received (see Table 3).

Sub-group repartition	Activities	Resources	Productions
4 sub-groups per thematic group. <u>Cancer:</u> Sub-group 2.1 = 4 GE students Sub-group 2.2 = 4 BE students Sub-group 2.3 = 4 MO students Sub-group 2.4 = 4 YA students	Fact sheet completion (around data validation problems)	a) Field research b) Links to web sites (knowledge base)	a) Fact sheets b) Forum discussion

Table 3. Summary of sub-group repartition, learning activities, resources and students productions for phase 3.

Phase 4. Phase 4 aims to familiarise the students with strategy planning for intervention.

Each thematic group is again divided into two sub-groups working on the cases they studied during phase 1.

Each sub-group makes an intervention proposal for the population illustrated by the case. The students put their planning (objectives, actions, resources, evaluation) in the knowledge base through an online form (see Table 4).

Sub-group repartition	Activities	Resources	Productions
2 sub-groups per thematic group (same as phase 1). <u>Cancer:</u> Sub-group 2.1 = 8 students (2 BE, 2 GE, 2 MO, 2 YA) Sub-group 2.2 = 8 students (2 BE, 2 GE, 2 MO, 2 YA)	Planning an intervention strategy	a) Field research b) Fact sheets (knowledge base) c) Links to web sites (knowledge base)	a) Intervention strategy

Table 4. Summary of sub-group repartition, learning activities, resources and students productions for phase 4.

Figure 3 summarises the succession of activities for the whole scenario.

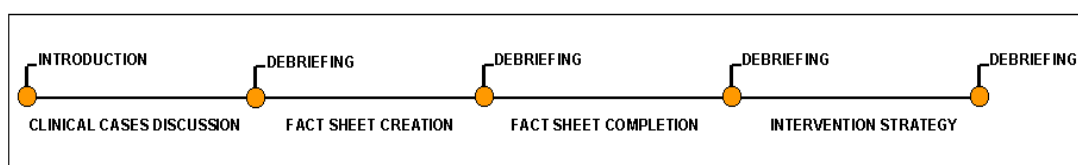


Figure 3 : Summary of the learning activities of the phases.

4. Problems and solutions

From the constraints imposed by the multidirectional and international character of the project and by the format of the environment we develop, we identified several problems. In order to give all participating students access to the environment, we must ensure that sufficient hardware and software resources are available in the countries of the South. The faculty of Yaounde in particular was not even connected to Internet in the beginning of the project. In a joint venture the library of the medical school in Yaounde is now connected, be it through a shared 64 kb satellite bottleneck.

In view of the limited bandwidth and frequent congestion of gateways to our partners any large bandwidth or continuity of connection dependent activities like synchronous chat or voice are, for now, impossible. We therefore chose to develop an environment requiring only the use of a web browser and lightweight page coding with text and asynchronous discussion and exchange. We decided to use a MySQL data base (<http://www.mysql.net/>) with PHP, a language which interfaces MySQL and HTML (<http://www.php.net/>). In a later stage of the project when more partners join and bandwidth problems become less limiting, the use of an integrated e-learning environment such as Thinktanx® (<http://www.viviance.com/>) is foreseen.

The effectiveness of the group discussion depends critically on the animation by the tutors. We therefore must recruit, motivate and train the teachers who will take part in the experiment. Beaudin (1999) proposes three strategies to motivate the teachers:

1. Academic recognition of teaching activities.
2. Compensation of teaching hours with decreased workload or additional salary.
3. Training preceding teaching activities.

We chose to train the teachers who will take part in the activities. Beaudin (1999) insists in particular on the quality of the questions put in an electronic forum. Our teachers will have to go beyond the basic questions like: What are the public health elements of the clinical cases? What are the differences between the two cases? And between the countries? We currently work with the teachers on the type of intervention which they will be able to make in the electronic forums to stimulate the discussions and to direct the students in their work. We are also writing detailed tutor guides that will help them during the whole undertaking.

5. Conclusions

Our first objective is to show that simple internet technology may improve international exchange and communication on community health issues, specially on a North-South axis. We therefore brought together partners from Switzerland, Tunisia, Cameroon and Lebanon around a common goal: learning and teaching community health. We negotiated learning objectives and knowledge content and we constructed a well defined and structured CSCL scenario accessible to all partners through a web environment using lightweight pages.

Our second objective is to show that CSCL may profit from the socio-economic and cultural differences between students from different countries when put in a well-structured learning scenario. To achieve this goal, we defined a whole of design principles to better conceptualise the vague notion of CSCL scenario. We then used these principles to conceive the scenario that we present in this paper.

The achievement of these two objectives will be assessed with appropriate evaluating tools as questionnaires to students and tutors about the format and the content of the learning activities and with systematic analyse of users actions in the environment.

In conclusion, global access to internet technology paired to proper CSCL design allows new innovative international collaboration that exploits the cultural and socio-economic differences between countries.

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7. References

- Beaudin B. P. (1999) Keeping Online Asynchronous Discussions on Topic. *JALN*, 3 (2).
- Chastonay Ph., Farinelli T., Rougemont A. (1994) Certificat de santé communautaire: Une expérience originale à la Faculté de Médecine de Genève. *Rev. Med. Suisse Rom.* 11: 1087-90.
- Dillenbourg P., Baker M., Blaye A., O'Malley C. (1995) The evolution of research on collaborative learning. Dans : *Learning in Humans and Machines : Towards an Interdisciplinary Learning Science*. Elsevier, Oxford.
- Health On the Net (1999) Analyse de la 5ème enquête sur l'évolution de l'utilisation d'Internet pour le domaine médical. (http://www.hon.ch/Survey/ResultsSummary_oct_nov99_f.html)
- Quignard M., Baker M. (1999) Favoring modellable computer-mediated argumentative dialogue in collaborative problem-solving situations. *Artificial Intelligence in Education*. S.P. Lajoie and M. Vivet (Eds). IOS Press.
- Schwartz D. L. (1995) The Emergence of Abstract Representation in Dyad Problem Solving. *The Journal of the Learning Sciences*. 4(3). 321-354.